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ABSTRACT

Attention to professional community has increased markedly over the last few years as part of both practitioner and scholarly efforts to promote improvements in student learning. Interest in this area joins two previously distinct literatures--one dealing with the benefits of communal school organization, another with enhanced teacher professionalism--to formulate a theoretical framework for a school-based professional community. Using data from a large urban school district, this paper empirically tests the impact of structural, human, and social factors on the emergence of school-based professional community and the extent to which such developments in turn promote more productive organizational functioning. Data were obtained from a survey of public school elementary teachers in Chicago administered during spring 1994 to 5,690 teachers in 248 elementary schools. Three core practices are found in a school-based professional community--reflective dialogue among teachers, deprivatized practice, and peer collaboration. The findings also underscore the importance for small school size as a key structural factor. Perhaps the most important and hopeful conclusion is that a professional community can exist in very ordinary urban schools. Moreover, positive teacher reports about professional community came from a wide cross-section of schools. One table is included. Appendices contain methodological notes. (Contains 60 references.) (LMI)

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FINAL DELIVERABLE TO OERI

Professional Community In Chicago Elementary Schools: Facilitating Factors and Organizational Consequences

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Revised
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Abstract

Attention to professional community has increased markedly over the last few years as part of both practitioner and scholarly efforts to promote improvements in student learning. Interest in this area joins two previously distinct literatures--one dealing with the benefits of communal school organization, another with enhanced teacher professionalism--to formulate a theoretical framework for a school-based professional community. Using data from a large urban school district, this paper tests empirically the impact of structural, human, and social factors on the emergence of school-based professional community and the extent to which such developments in turn promote more productive organizational functioning.

Introduction

Attention to professional community has increased markedly over the last few years as part of both practitioner and scholarly efforts to promote improvements in student learning. This interest blends ideas from two different streams of work. There is extensive evidence now that schools organized as communities promote greater teacher commitment and more student engagement in school work (Bryk and Driscoll, 1988; Lee, Smith, and Bryk, 1993; Rowan, 1993; and Bryk, Lee and Holland, 1993). Similarly, enhanced teacher professionalism is widely viewed as a prerequisite in efforts to promote more challenging academic work for all students (Liebermann; 1988; Darling-Hammond; 1987; Rowan; 1994). Kruse, Louis, and Bryk (1995) joined these two previously distinct literatures together to formulate a theoretical framework for a school-based professional community.

The extant research on school-based professional community has been limited to a small number of substantially restructured schools (Newmann and Whelage, 1995). Although some of these are located in urban contexts (see for example the case study by Raywid, 1995), most of the schools studied to date are either new schools, alternative schools or magnets. As a result, they have benefited from some selectivity with regard to both faculty and students. In contrast, this study uses an empirical data base from an urban school district, Chicago, Illinois, to examine some key propositions about professional community in a large sample of "ordinary" public elementary schools.

Like most urban districts, the Chicago Public Schools suffers from very low student achievement, and until the recent past at least, work conditions have not been especially conducive to the emergence and sustenance of school-based professional community (Squires,

1988; Hess, 1991). Like urban schools generally, Chicago has had difficulty recruiting and retaining the most talented teachers (Englert, 1993). Typically, urban teachers are also less involved in policy decisions, are treated with less respect by administrators, and have fewer opportunities to engage in significant work with each other (Corcoran, Walker, and White, 1988). In addition, the nature of work in urban schools is often hurried, focused on the short-term, and subject to frequent external redirections. Under such circumstances, few teachers and administrators are inclined toward being "reflective practitioners" who eagerly seek new information to improve their work. Ultimately, the presence of adverse conditions such as these reduces teachers' sense of efficacy and commitment to their work, and also tends to promote more negative attitudes toward the students they teach (Rosenblum, Louis and Rossmiller, 1994).

Conditions in many Chicago elementary schools, however, changed quite dramatically in the aftermath of the Chicago School Reform Act of 1988. Bryk et al. (1993) have documented a substantial expansion of participation in local school affairs by parents, teachers, and community members. Substantial local initiative has focused on broad and deep restructuring of school operations. These local change efforts were catalyzed by the 1988 reform which devolved considerable resources and authority to local school actors over school improvement efforts. Under such conditions, it is reasonable to expect that alternative work organization for teachers, such as school-based professional communities, might emerge in at least some schools. In a 1994 survey of Chicago public elementary school teachers, the Consortium on Chicago School Research captured a snapshot of these developments five years after the onset of reform. This paper uses teachers' responses from that survey. We examine both the impact of structural, human and social factors on the prevalence of school-based professional community and the extent to which such developments are linked to more productive organizational functioning.

Conceptualizing Professional Community

Three core practices characterize adult behavior in a school-based professional community: *reflective dialogue* among teachers about instructional practices and student learning; a *deprivatization of practice* where teachers observe each others' practice and joint problem solving is modal; and *peer collaboration* where teachers engage in actual shared work. Undergirding these practices are *shared norms focused on student learning*. Kruse, Louis, and Bryk (1995) argued that this combination of core practices and shared norms creates a distinctive workplace for teachers. We elaborate below on the nature and rationale for each of these features.

Essential Features of Professional Community

Reflective dialogue. Strong professional communities are built on teachers who regularly engage in discussions with colleagues about their work. By engaging in extended conversations that hold beliefs about teaching and learning and instructional practice under scrutiny, teachers can examine the assumptions basic to quality practice (Newmann, 1991). Reflection upon practice leads to deepened understandings of the process of instruction and of the products created within the teaching and learning process.

Deprivatized practice. In professional communities teachers move behind the classroom door of their colleagues to share and trade off the roles of mentor, advisor, or specialist (Lieberman, Saxl, & Miles, 1988; Little 1990). Through strategies such as team teaching and peer coaching, teachers share and observe each other's methods and philosophies. This opening up of one's practice to scrutiny also encourages teachers to ask questions about their practice and to view it in a more analytic fashion. In this way, teachers also come to know each other's strengths, and can therefore more easily find "expert advice" from colleagues.

Collaboration/shared work. Cooperative relationships are a critical component of a

productive workplace. This entails considerably more, however, than a mere cordiality among staff. While the latter is a basic social quality necessary to maintain a workplace (Bryk and Schneider, 1996), real collaboration involves shared work. In an advanced professional community, teachers collaborate on school-wide projects and are broadly engaged in school improvement efforts. Such activities foster the sharing of expertise as faculty members call on each other to address the problematics of practice (Little, 1982, 1990). Collaborative work also increases teachers' sense of affiliation with each other, and with the school, and their sense of mutual support and responsibility for effective instruction (Louis, 1992).

Shared norms focused on student learning. A set of norms underlie the three practices discussed above and bring coherence to a school-based professional community. Specifically, a focal attention on student learning is the anchoring content of such a workplace (Newmann and Wehlage, 1995). Because teachers in these communities strongly believe that all students can learn, advancing the education of all students becomes the central concern. As such, teachers' professional actions consistently focus on choices that affect students' opportunity to learn and provide substantial student benefit (Abbott, 1991; Darling-Hammond & Goodwin, 1993; Darling-Hammond & Snyder, 1992; Little, 1990). Moreover, when such beliefs and values are normative in a school, it creates an informal social control mechanism that strongly guides adult behavior. This stands in sharp contrast to a "work to rules" mentality, grounded in fiscal incentives and formal sanctions, which is characteristic of a more mechanistic organization of teachers' work (Rowan, 1993; Weisbord, 1991).

Organizational Factors Facilitating Professional Community

The research presented in this paper evolved out of a larger multi-investigator center of work on the organization and restructuring of schools. This center has sought to develop a

comprehensive and integrated theory of the embedded contexts of support needed to sustain rigorous intellectual activity for all students. (For a general introduction see Newmann and Wehlage, 1995). Within this larger framework, a school-based professional community is conceptualized as a key organizational capacity necessary to promote the faculty development and instructional improvements required to advance such learning. We argue that this organizational capacity is in turn supported by a set of facilitating conditions--human, social and structural--as described below.

Size. A substantial body of research evidence indicates that small schools are more engaging work environments for both students and adults. (For a review of this research see Lee, Bryk, and Smith, 1993). In general, school size plays an important role in structuring the social dynamics of the school workplace (Bidwell and Bryk, 1994). Small schools tend to have fewer programs, and as a result, staff are more likely to engage in common endeavors. In addition, because of the compactness of the social network, communication can more easily flow through direct face-to-face interactions, rather than relying on more bureaucratic mechanisms. Both this common sense of purpose and opportunities for communication should be valuable assets to the development and maintenance of a professional community.

Principal leadership. "Good" principal leadership has been frequently associated with improved student learning. However, the specific aspects of principal leadership that promote these developments are less clear. Some have found that a highly facilitative principal leadership style, with the "principal as follower" or "leading from the center" promotes better restructuring (Murphy, 1994). Other studies have indicated, however, that a more directive leadership style may be helpful (Murphy, 1989; Louis 1991). Whatever the specifics, it seems very unlikely that a professional community can be sustained within a school without strong principal support. On

the managerial side, time and resources must be provided to allow this to occur. From a communal leadership perspective (Sergiovanni, 1992), principals play a key role by nurturing a normative climate where innovative professional activity is valued (Bryk et al. 1993).

Access to new ideas. The importance of the flow of good information into the hands of teachers has been an undercurrent in research on educational improvement for a long time (Havelock et. al., 1969; Louis and Sieber, 1979; Huberman, 1995). In a very real sense, the access to new ideas fuels a professional community. Even though urban schools are often located in the "knowledge production capitals" of the country, they are typically isolated from expertise about effective new practices. This isolation, in turn, makes them less able to adopt and implement innovations (Natriello, McDill and Pallas, 1990), and less inviting places for teachers to work.

Socialization of new professional members. Where strong school norms exist, we are also likely to find deliberately maintained processes to socialize new members into these norms (Driscoll, 1989; see Raywid (1995) for a case study account of one such school). Through their mutual efforts, teachers generate an induction process to protect existing routines and perpetuate the school community. In contrast, schools that pay no attention to socializing newcomers are often "normless" and provide anomic environments inconsistent with the core premise of a professional community.

Trust. The social resources of a school community are key elements in school wide improvement efforts (Bryk and Schneider 1996; Spillane and Thompson, 1997) and more generally in the efficient functioning of schools (Bryk, Lee, and Holland, 1993). Previous research has documented that trust and respect from colleagues inside the school and key members of relevant external communities are necessary conditions for developing teacher

commitment (Firestone and Rosenblum, 1988; Louis, 1992). Without trust among faculty, change efforts may become contrived and lack lasting impact (Hargreaves, 1992; 1994). For these reasons, we hypothesize that social trust is another key facilitating factor for professional community.

Parent involvement. Earlier research on the implementation of Chicago school reform found that expanded participation of parents and community members in school affairs was a strong predictor of sustained efforts at school change (Bryk et al., 1993). However, not all forms of expanded parental and community involvement were productive. In a small proportion of cases a very adversarial politics emerged that undermined any capacity for sustained attention to school improvement. Nonetheless, we hypothesize that when parents are more involved in their children's schooling, teachers will generally derive support and encouragement from this.

Effects of Contextual and School Compositional Factors

In addition to these structural, human and social facilitating factors, a number of other school community characteristics are likely to influence the development and maintenance of professional community.

Racial diversity among faculty members. Community, it is often observed, is more likely to occur in homogeneous rather than heterogeneous groups (Bryk and Driscoll, 1988). When all members of the group share the same assumptions, habits and values, it is reasonably easy to engender the trust and stable expectations for behavior that support community (Coleman, Hoffer and Kilgore, 1982). Because urban teachers are more diverse in their backgrounds than a typical small town or suburban setting, differences in the racial and ethnic composition of schools, both among faculty and students, may decrease community among teachers.

Gender composition. It is argued that the gender composition of a school faculty may also affect community, because the expectations women and men have about values, goals, and work-related behavior differ (Hofstede, 1991; Shakeshaft, 1987; Tannen, 1994). Women, in general, are more interested in dense patterns of informal communication at work, and less likely to prefer individualistic work settings. Louis and Marks (1996) found some evidence that gender composition can affect the development of professional community in a study of 24 elementary, middle and high schools. Since their sample size was small, however, they were unable to control for the possible confounding effects of school level (i.e. secondary versus elementary schools) on professional community. The results presented here affords a more rigorous empirical test of the gender composition hypothesis.

Work force stability and turnover. A mature professional community is built on patterns of interaction over time that increase trust and reinforce common expectations. From this perspective, we would expect that work force stability would characterize such a community. In contrast, we hypothesize that the emergence of professional community, in places where it has not previously been commonplace (as in urban systems like Chicago), may be characterized by high faculty turnover during its early stages. Previous research has documented that many Chicago schools at the onset of the 1988 reform were characterized by a stable core of very senior faculty who had come to accept the dysfunctional state of affairs and were not especially inclined to challenge them (Rollow and Bryk; 1993; Bryk et al. 1993). A major faculty turnover may be required under such circumstances to catalyze initiative. Case study evidence supports this hypothesis. Specifically, Bryk et al. (1993) report that since the 1988 Reform Act, Chicago principals can hire teachers of their own choosing without regard to seniority or "bumping rights." Principals in actively restructuring schools are using this new authority, coupled with

aggressive efforts to "counsel out" problematic colleagues, to reshape their faculties.

Neighborhood context. One of the primary aims of the Chicago reform legislation was to reconnect schools with the families and communities they serve. These connections between school, parents, and communities can be a resource for school improvement efforts. However, factors such as high rates of residential mobility, poverty, and illiteracy among the adult population make the establishment of these links an extremely challenging task. Thus, we expect that the development of professional community will be more difficult in more disadvantaged community contexts.

The Impact of Professional Community on School Operations

As we noted in the introduction, interest in school-based professional community arose out of a study of efforts to restructure schools to promote more challenging intellectual work for all students. While in almost any school, individual teachers can be found who advance this aim, a broadly shared base of such practice requires collective cooperative efforts across a faculty. Thus, we hypothesize that in schools organized as professional communities faculty should be more likely to assume responsibility for school operations and improvement (rather than seeing this as the sole province of district officials or the school principal.) Similarly, faculty should actively engage in innovation and learn from it in order to promote school-wide improvement. We develop below two school-level measures of such collective faculty activity and examine whether these orientations are more common in schools organized as professional communities.

Methods and Data

This study uses data from a survey administered to public elementary school teachers in Chicago during the Spring of 1994 to examine the hypotheses described above. The purpose of the survey was to gather information on teachers' views of the school environment, classroom

learning, parent involvement, governance, and the professional work life of teachers. Data from 5,690 teachers in 248 elementary schools were analyzed for this paper. Supplemental information about school background and neighborhood context were drawn from Chicago Public School records and 1990 U.S. Census.

Measures of the components of professional community and its organizational correlates were developed by applying a Rasch rating scale model to clusters of items from the 1994 teacher survey (Wright and Masters, 1982). Rasch analyses produce three statistics that are particularly useful in assessing the reliability and validity of measures. The first is item difficulty, which estimates the likelihood that respondents will endorse the position, attitude, or behavior represented by each item within a scale. Common events, attitudes, beliefs, etc. are "less difficult" to endorse; rarer ones are "more difficult." In this study, all item difficulties have been placed on a zero to ten scale with the least difficult items (i.e. most prevalent beliefs, attitudes and behaviors) having low values on the scale. The resultant person measures share the same zero to ten scale with high scale scores associated with the most positive reports.

A second statistic, infit mean square, indicates the extent to which respondents' answers to an item are consistent with the hierarchical placement of the item in the scale. If the infit mean square statistic is approximately 1.0, this means that individuals are responding to the item consistent with its location in the scale. For example, if respondents endorse or agree with a particular item, they should also endorse the "easier" items below it in the scale, but not necessarily endorse the "more difficult" items above it. Thus, the infit mean square statistics capture the extent to which persons' response patterns align with a hierarchical rank-ordering of items.

A third statistic is the person separation reliability. This is directly analogous to a Cronbach's Alpha and measures the internal consistency reliability of each scale. Taken together, these item statistics provide considerable evidence for evaluating the validity of each measurement constructed.

Professional Community Measures

Four component measures were created to tap each of the constituent elements of a professional community. Appendix 1 presents the results of the Rasch rating scale analyses for these measures. All four appear to follow a theoretically consistent hierarchical ordering with acceptable person separation reliabilities ranging between 0.70 and 0.85. Of the 23 items that make up the component measures of professional community, only 3 had infit mean square statistics that were substantially higher than 1. This indicates that most respondents' answers were very consistent with the hierarchical ordering of the items in these four scales.

Reflective dialogue. This nine item cluster focuses on teachers' conversations with one another about instruction and student learning. Teachers reported how often they discuss with colleagues the nature of teaching and learning, ways to help students learn, ways to manage classrooms, the goals of the school, and developing new curriculum. Teachers were also asked whether they express their views at faculty meetings, share personal opinions, and discuss matters of teaching and instruction with colleagues. A high score on this scale means that extensive conversations are occurring that move beyond basic classroom management to include both student learning and school-wide improvement initiatives.

Deprivatized practice. Five items comprise this scale. It measures the extent to which colleagues share useful information about new curriculum materials, observe or teach in each others' classrooms, and provide meaningful feedback on their teaching. A high score means that

teachers have opened their classrooms to outside scrutiny and have worked together to improve instruction.

Staff collegiality/collaboration. Teachers were asked about the quality of relations among the faculty, whether school staff coordinate teaching and learning across grades, and shared efforts to design new instructional programs. This four item scale assesses the extent of a cooperative work ethic among staff with high scale scores reflecting a school context where faculty have moved beyond mere cordial relations to actively working together.

Focus on student learning. This five item cluster evaluates the extent to which activity and decision making in schools are directed at creating an environment in which students can learn well. Teachers reported whether the school had well defined learning expectations, set high standards for academic performance, organized the school day to maximize instructional time, and focused important decisions on what is best for student learning. To obtain a high scale score on this measure, teachers had to strongly agree that all of these practices were characteristic of their school.

Professional community composite. A principal components factor analysis was performed to determine whether it was reasonable to combine the component measures of professional community into a single composite. Only one factor emerged with an eigenvalue greater than 1.0. This factor explained 64 percent of the common variance in the four component measures. Each factor loading was close to 0.80 or higher. This statistical evidence strongly suggests that the four component indicators of professional community measure a single organizational construct. Since preliminary analyses based on each of the separate components yielded highly consistent findings, we present here only the results using the composite measure.

The composite measure used here is an "information weighted" mean of the four separate

components. In addition to producing a measure for each person, a Rasch rating scale analysis also estimates a "real standard error" for each person that takes into account whether they answered all of the items (or only a subset) and the extent to which their individual responses are consistent with the estimated hierarchical ordering. The standard error is inflated to the extent that information is missing or the responses appear inconsistent. The inverse of this standard error is proportional to the information associated with each person's measure and was used as a weighting factor in creating the composite. (See Appendix 2 for a discussion of how a Hierarchical Linear Model analysis [Bryk and Raudenbush, 1992] was used to accomplish this.)

Organizational Correlates

We conducted two additional Rasch rating scale analyses to create measures of the extent to which school staffs are collectively responsible for school improvement and maintain an environment oriented toward organizational learning (See Appendix 1). The reliability of these were 0.90 and 0.78 respectively. Again, the estimated hierarchical ordering of the survey items seemed theoretically appropriate and only two items in these scales had infit mean square statistics that were significantly greater than 1. Although we formally hypothesized that the emergence of professional community should lead to a greater collective responsibility for school operations and improvement and accelerate professional learning across the organization, to test this properly requires longitudinal data. Given the cross-sectional data currently available to us, we simply examine at this point the strength of the association among these organizational constructs. Clearly, a strong statistical relationship is logically consistent with (but does not prove) the hypothesized causality.

Collective responsibility for school operations and improvement. A cluster of six items focuses on the extent of a shared commitment among the faculty to improve school

operations. Items in this scale asked teachers about how many of their colleagues feel responsible to help each other do their best, work together to improve the school, and work to maintain discipline in the entire school. A high score on this scale signals the existence of a strong sense of shared responsibility among the faculty to improve day-to-day operations.

Organizational learning. This set of five items asked about whether teachers are continually learning and seeking new ideas, have a "can do" attitude, and are encouraged to change. When teachers strongly agree with items of this sort, (i.e. a high scale score), this indicates that conditions are ripe in a school for organizational learning to occur.

Facilitating Factors School Context and Teacher-level Controls

As noted earlier, a variety of school and community context variables should predict professional community. It is also reasonable to expect that some teachers are more predisposed to seek out and participate in professional community than others, and that their personal background characteristics may explain some of this variance. Appendix 1 provides a complete description for all of the teacher, school and community variables used.

Statistical Modeling

A three-level hierarchical linear model was used to test the conceptual framework. We conducted two sets of analyses. The first set modeled the composite measure of professional community as a function of the hypothesized facilitating factors, school context and composition, and teacher-level controls. Specifically, the level-1 model creates the information weighted composite measure of professional community. The teacher-level controls are introduced at level 2 and the facilitating factors, school context and composition variables at level 3. Three separate models were estimated: one considering school context and composition effects (model 1); a

second taking into account the effects of school size (model 2); and a third adding the remaining facilitating factors (model 3).

The second set of analyses examined the two expected organizational correlates of professional communities: collective responsibility and organizational learning. The modeling framework is similar to the first set of analyses. The level-1 model takes into account the errors of measurement associated with each outcome. Level 2 again considers teacher effects and we now add at level 3 the professional community composite as a predictor variable. Again three separate models were estimated with the third model now including the effects of professional community on collective responsibility for school operations/improvement and organizational learning respectively. Appendix 2 provides further technical details about the statistical models used here.

Results

Effects of Facilitating Factors, Context, Composition and Teacher Characteristics on Professional Community

An unconditional (i.e. no predictors at the teacher or school levels) HLM analysis decomposed the total variance in the professional community composite into measurement error, variability among teachers within schools and variability between schools. After partialling out measurement error, 16.7 percent of the variance in teachers' responses is between schools. Although proportionately modest, this estimated between school variability is substantively important. Using the same measures that were developed for this study, Bender-Sebring, et al. (1995) documented that schools ranked in the top quartile on a composite of the professional community measures, tend to have an overwhelming majority of faculty members who engaged in the core activities of professional community. As a result, we may consider the practices of a

professional community to be normative in these contexts. In contrast, in the bottom quartile schools, only a minority of schools' faculties report such activity. While pockets of professionalism may be operating in such places, school-wide professional community is not occurring.

Teacher characteristics. Model 1 in Table 1 presents these results. Teachers who commit considerable out of class time on school committees and activities are more likely to offer positive reports about professional community. Theoretically, such voluntary participation in school affairs is an important condition for building and maintaining a community within a school. Thus, we expect the positive relationship found here. We also suspect that "high involvement teachers" will generally tend to view their school in positive terms, and thus offer more glowing reports across the entire survey. From this second perspective, the level of individual teacher involvement represents an omnibus control variable in the analysis, parceling out an overall response effect on the survey.

We also found differences associated with teachers' race/ethnicity and experience. Both African-Americans teachers and those with more years of experience reported higher levels of professional community. In total, the teacher characteristics we employed as controls accounted for about 6 percent of the variation among teachers within schools on the professional community composite. We also note, that since all of these variables were grand mean centered in the analysis, average differences between schools on these factors are also taken into account (see Bryk and Raudenbush, 1992, chapter 5). As a result, some between school variation is explained.

Insert Table 1 about here

School context and composition. Models 1 and 2 in Table 1 estimate the effects of various school context and composition factors and school size. In terms of context and composition factors (model 1), most of the estimated effects are negligible (i.e. estimates are about the size of their corresponding standard errors.) The only statistically significant result was for pre-reform achievement with professional community being somewhat more prevalent in higher achieving schools. As hypothesized, there is also some indication that enrollment and neighborhood stability are positively associated with a school-based professional community. In contrast, we found that faculty stability was negatively related to the existence of professional community. This result is consistent with the field observations offered in Bryk et al. (1993) that principals in actively restructuring Chicago schools were aggressively using the authority granted them under school reform to reshape the composition of their faculties.

Of all the factors considered here, clearly small school size stood out as most important. (See model 2 in Table 1). Professional community was much more prevalent in elementary schools with less than 350 students than it was in larger schools. When small school size was taken into consideration, none of the remaining context or composition variables were statistically significant.

These results suggests that professional community can develop in schools with widely varying characteristics in terms of the types of students served, the composition of the faculty and the kind of neighborhood where the school is located. To the point, this is not principally an upper middle class phenomenon.

Facilitating factors. We hypothesized that in addition to small school size, principal supervision and leadership, parent involvement with the school, teachers' access to new ideas, teacher socialization of new members, and trust among faculty would act to facilitate the growth and maintenance of professional communities in elementary schools. We found that, even after controlling for teacher characteristics, school context and composition, all of the hypothesized facilitating factors, except parental involvement, were positively related to the professional community composite measure.

By far, the strongest facilitator of professional community is social trust among faculty members. When teachers trust and respect each other, a powerful social resource is present in a faculty to support the collaboration, reflective dialogue, and deprivatization characteristics of a professional community. On balance, we note that the dynamic relationship between professional community and social trust is likely to be mutually reinforcing. As the practices of community are enacted, trust and respect should deepen. Thus, a base level of social trust may be necessary for the emergence of a professional community, but as such a community of practice actually develops, the social resources of the community further expand. In this sense, trust has been characterized as a moral resource, in that, unlike other resources such as fiscal capital, its supply increases through use (Hirschman, 1970; Putnam, 1993; and Bryk and Schneider, 1996).

We note that the large effect associated with school size in model 2 became negligible in model 3 once the complete set of human and social facilitating factors had been introduced into the analysis. This result is consistent with the hypothesized role of small school size as a structural facilitating factor. As noted earlier, smaller schools pose simpler managerial problems because they tend to have more constrained missions and because the overall social network

among adults is more compact. This creates a set of conditions conducive to the human and social resource developments necessary for a professional community to emerge and be sustained. Smallness per se, however, does not cause professional community. Stated somewhat differently, community within a small school can be just as unprofessional as that in a large school if school-based actors choose not to seize the opportunities available to change their practice. In contrast, the structural features inherent in large schools, make positive developments harder, although surely not impossible, to attain. It is in this sense that small school size is an important structural facilitator.

We also note that model 3 accounts for virtually all of the between school variance in the professional community composite. This does not necessarily mean, however, that our hypothesized facilitating factors, as well as context and composition influences, represent a complete explanation of this phenomenon. There may well be other important specific factors that operate to form and sustain professional communities. Such other unmeasured factors, however, would have to be highly related to the ones already included in the model, since the measures used here are in essence acting as instruments for these other influences.

Organizational Correlates of Professional Community

We next examined two key organizational correlates of professional community: collective responsibility and organizational learning. As with the professional community composite, most of the variation in these outcomes lies within schools. Roughly 16 percent of the variation in organizational learning and 22 percent of the variation in levels of collective responsibility lies between schools. Nonetheless, the observed differences among schools are again substantively important and merit study (Bender-Sebring et al. 1995).

The analyses follow the same general pattern as those described above for modeling professional community. Models 1 and 2 take into account school context, composition and school size effects. Model 3 brings the various facilitating factors into the analysis. We also introduce here the school average for the professional community composite. This provides a test of the effects of professional community on collective responsibility for school operations/improvement and organizational learning net of teacher, school and neighborhood background and net of the set of facilitating factors. Because of the extensive set of organizational controls included in this analysis, the end result is a conservative test of our hypothesized correlates of professional community. Under a more liberal conceptualization, some of the factors for which we are adjusting in this analysis, such as social trust and active socialization of new faculty members, might also be thought of as consequences of professional community and thus should not be controlled for in estimating professional community effects.

Insert Tables 2 and 3 about here

Teacher characteristics. In general, the kinds of teachers who offer more positive reports about professional community in their schools also tend to report higher levels of collective responsibility and organizational learning. Specifically, African Americans and teachers who are more involved, or more experienced, offer more positive reports. We also found a positive effect associated with female teachers on organizational learning but less so for collective responsibility.

School context and composition. As with the professional community composite, a pattern of negative effects relates faculty stability to collective responsibility and organizational

learning. Both of these outcomes appear somewhat more prevalent in schools where there has been recent faculty turnover. In addition, low student mobility (as measured by the enrollment stability rate) was found to be supportive of organizational learning but not of collective responsibility for school operations and improvement.

Again, the most consistent findings occurred for small school size. Both organizational learning and collective responsibility are more common in small schools. We note that the small school effect on collective responsibility persists even in model 3 when we take into account the human and social facilitating factors and the professional community composite measure.

Facilitating factors and professional community effects. In general, both collective responsibility and organizational learning were found to be much more prevalent in schools in which professional community has developed, even after the characteristics of teachers in a school, the school's context and composition, and the facilitating factors were taken into consideration. In fact, professional community was by far the most powerful predictor of these two outcomes. Virtually all of the between school variability in the two outcomes is explained after this factor is entered into the equation.

The magnitude of the estimated professional community effects becomes clearer if we consider them in comparison to the actual between school variability on each outcome. The estimated standard deviation among schools for collective responsibility and organizational learning are 1.21 and 1.07 respectively. A movement from a moderate low professional community school (-1 s.d.) to a moderate high one (+1 s.d.) involves a shift of about 1.6 points on the 10 point professional community composite scale. All other factors being held constant, this would have a predicted effect on collective responsibility and organizational learning of 0.6 s.d. and 1.4 s.d. respectively.

Among the facilitating factors, teacher socialization was positively related to both outcomes. Teacher trust was a strong predictor of collective responsibility, but not for organizational learning. Similarly, principal supervision has a direct positive effect on collective responsibility. This result suggests that a principal's involvement in instructional matters has a positive influence on collective responsibility for student learning net of the other effects already documented of supervision and leadership on professional community formation.

It is noteworthy that access to new ideas was not directly related to organizational learning and had a negative effect on collective responsibility. (This negative relationship appears anomalous. The zero-order correlation between these two variables at the school-level is actually weak positive (.09). Given that access to new ideas is moderately correlated with a number of the other school-level predictors, this finding is probably not meaningful.) The absence of a direct link to organizational learning, however implies that simply having more access to new ideas does not necessarily precipitate collective change. Consistent with the arguments advanced in this paper, internal structures and faculty norms must also be in place within the school that allow these ideas to become collectively held and practiced. This is the essence of a functional professional community.

Discussion

The results presented in this paper sit within a larger integrated program of work on school organization, restructuring and effects on student learning. Through both case studies and statistical findings from small samples of special schools, the Center on School Organization and Restructuring (CORS) has demonstrated that schools can operate to produce intellectually challenging work for a diverse cross-section of students. Our study is the first to document that some of the organizational features identified in the Center's work can exist on a broad scale in

regular urban elementary schools. Although this study does not directly examine the "bottom line" of effects on student achievement, the connection between professional community and student achievement have been documented by the Center in its smaller scale investigations (Newmann and Whelage, 1995). Analyses of large scale national data sets have also established a connection between collective responsibility and student learning at the high school level (Lee and Smith, 1996). We intend to examine this further in future research as data on trends in student achievement under Chicago school reform become available.

Our results also sit within a second and ongoing stream of inquiry, conducted by the Consortium on Chicago School Research, that charts the progress of school reform in the city. These studies have documented a strong link between expanded local participation and the types of organizational changes detailed here. The democratic localism promoted by Chicago reform, has created a political force in many school communities to challenge a dysfunctional status quo and support deep changes in how schools are organized and operate. In this local political context, a radical restructuring of teachers' work around ideas of professional community has had opportunities to emerge. While such school-wide developments are modest in number, and do not approximate the more mature examples documented in the literature, nonetheless one has to consider this a significant accomplishment of the reform.

On balance, we know that efforts specifically designed both to stimulate professional community and to improve classroom practices typically confront very uneven local school circumstances (see for example, Bryk, Rollow and Pinnell, 1996). In a conducive setting, a significant segment of the faculty will embrace these ideas, be supported by their principal, and over time be able to influence other colleagues to join them in reflective discussions and collaborative work. In other settings, however, teachers who do not want to disturb the status

quo may actively oppose change, and school leadership may remain ineffective. These schools may be balkanized with some teachers resenting the additional demands that restructuring entails, and not wishing to change the extant norms of virtually unimpeded classroom autonomy. Where these conditions--which are fairly common--exist, the variance within schools will remain great.

Against this backdrop, the modest between school variance component on professional community reported in this study seems quite reasonable. While it marks out the current state of affairs in urban elementary schools, it does not in any sense delimit the potential of this set of ideas to transform school practice. Only the actual experience of schools seeking to work with these ideas over some sustained period of time can tell us about this.

The results presented in this paper also underscore the importance for small school size as a key structural facilitator. Small school size affords a context where many of the social resources discussed above can more readily emerge and flourish. Since smaller schools are easier to manage, effective principal leadership, not surprisingly, is also easier to exercise. Because teachers have opportunities for face-to-face social interactions with most other members of their school faculty, a broad base of social trust is more likely. Socialization of new members can also be handled through personal mentoring rather than more formal orientation programs. In general, both a commonality of purpose and base of personal regard is more likely in a small school and this in turn facilitates the emergence and maintenance of a professional community. As noted earlier, however, small size does not cause professional community. A small school can be just as problematic a work environment as a large one. A small school, however, does afford opportunities to school-based actors which are not as readily accessible to their counterparts in large schools. It is in this sense that small school size is a key structural facilitator.

Perhaps the most important and hopeful conclusion to be drawn from this research is that a professional community can exist in very ordinary urban schools. Moreover, positive teacher reports about professional community came from a wide cross-section of schools. Student body composition in terms of race/ethnicity, socioeconomic factors and even academic background were not strong predictors of a school's professional community.

In terms of future research, it is important to focus more attention on how such school-based professional communities actually emerge and are sustained. While the research presented here offers several clues about facilitating factors in this regard, a true longitudinal study of the school change process would afford a more rigorous test of these hypotheses. It would also expand our understanding of the actual processes involved as schools move from a typical base state of hierarchical domination to one of collective faculty enablement organized around more challenging academic work for all students.

Table 1: Conditional Models for Professional Community Composite

	Model 1		Model 2		Model 3	
	coef	*se*	*coef*	*se*	*coef*	*se*
Level 2 predictors						
Teacher involvement	0.526	0.042 ***	0.525	0.042 ***	0.483	0.041 ***
Female	0.131	0.088	0.125	0.087	0.141	0.086
Black	0.371	0.086 ***	0.366	0.086 ***	0.333	0.084 ***
Hispanic	0.026	0.133	0.033	0.133	0.040	0.124
Teacher experience	0.011	0.004 **	0.010	0.004 *	0.011	0.003 ***
Missing on gender	-0.184	0.164	-0.183	0.165	-0.116	0.164
Missing on race	0.240	0.139	0.243	0.139	0.206	0.138
Missing on teacher experience	0.041	0.123	0.037	0.123	0.099	0.122
Level 3 predictors						
Context and composition						
Proportion of faculty that's female	0.069	0.058	0.060	0.054	0.011	0.034
Faculty stability	-0.092	0.063	-0.051	0.062	0.014	0.029
Integrated student body	0.170	0.189	0.192	0.187	0.083	0.099
Primarily African-American student body	-0.053	0.160	-0.130	0.155	-0.135	0.097
Primarily African-American faculty	-0.021	0.146	0.019	0.139	0.065	0.082
Primarily White faculty	0.219	0.180	0.227	0.179	0.048	0.086
Pre-reform achievement	0.723	0.351 *	0.489	0.342	0.161	0.149
Enrollment stability rate	0.226	0.137	0.220	0.137	0.034	0.068
Neighborhood poverty	-0.027	0.078	-0.015	0.076	0.013	0.050
Neighborhood stability	0.115	0.073	0.113	0.072	0.078	0.044
Facilitating Factors						
Small school size			0.548	0.155 ***	0.047	0.089
Principal supervision					0.252	0.110 *
Principal leadership					0.215	0.031 ***
Parent involvement					0.005	0.030
Access to new ideas					0.115	0.048 *
Teacher socialization					0.100	0.023 ***
Teacher trust					0.351	0.034 ***
Residual level 2 variance	2.994		2.991		2.966	
Residual level 3 variance	0.453		0.435		0.004	
Proportion of variance explained						
Level 2	0.064		0.065		0.072	
Level 3	0.210		0.242		0.994	

* p <= .05
** p <= .01
** p <= .001

Table 2: Conditional Models for Collective Responsibility

	Model 1		Model 2		Model 3	
	coef	*se*	*coef*	*se*	*coef*	*se*
Level 2 predictors						
Teacher involvement	0.380	0.062 ***	0.380	0.062 ***	0.332	0.059 ***
Female	0.149	0.134	0.155	0.134	0.111	0.133
Black	0.279	0.111 *	0.275	0.111 *	0.251	0.106 *
Hispanic	-0.230	0.195	-0.207	0.194	-0.181	0.184
Teacher experience	0.031	0.005 ***	0.031	0.005 ***	0.029	0.005 ***
Missing on gender	0.087	0.260	0.089	0.260	0.013	0.256
Missing on race	-0.058	0.222	-0.044	0.222	0.038	0.222
Missing on teacher experience	0.504	0.211 *	0.490	0.210 *	0.489	0.206 *
Level 3 predictors						
Context and composition						
Proportion of faculty that's female	0.146	0.098	0.127	0.087	0.032	0.045
Faculty stability	-0.182	0.097	-0.095	0.090	-0.053	0.048
Integrated student body	0.081	0.283	0.133	0.280	-0.103	0.136
Primarily African-American student body	0.132	0.306	-0.041	0.283	-0.087	0.164
Primarily African-American faculty	-0.236	0.271	-0.150	0.247	-0.069	0.149
Primarily White faculty	0.350	0.272	0.369	0.272	-0.064	0.129
Pre-reform achievement	1.381	0.624 *	0.856	0.586	0.186	0.268
Enrollment stability rate	0.197	0.230	0.187	0.230	-0.237	0.134
Neighborhood poverty	-0.105	0.134	-0.078	0.124	-0.006	0.066
Neighborhood stability	0.013	0.119	0.005	0.113	-0.019	0.059
Facilitating Factors						
Small school size			1.161	0.257 ***	0.313	0.151 *
Principal supervision					0.380	0.158 *
Principal leadership					0.028	0.052
Parent involvement					0.099	0.051
Access to new ideas					-0.207	0.066 **
Teacher socialization					0.198	0.033 ***
Teacher trust					0.425	0.065 ***
Professional community composite					0.475	0.093 ***
Residual level 2 variance	4.851		4.842		4.788	
Residual level 3 variance	1.096		0.997		0.004	
Proportion of variance explained						
Level 2	0.036		0.038		0.049	
Level 3	0.220		0.291		0.997	

* p <= .05
** p <= .01
** p <= .001

Table 3: Conditional Models for Organizational Learning

	Model 1		Model 2		Model 3	
	coef	*se*	*coef*	*se*	*coef*	*se*
Level 2 predictors						
Teacher involvement	0.496	0.076 ***	0.497	0.076 ***	0.410	0.071 ***
Female	0.456	0.152 **	0.455	0.151 **	0.428	0.149 **
Black	0.622	0.159 ***	0.614	0.159 ***	0.571	0.151 ***
Hispanic	-0.246	0.212	-0.239	0.212	-0.216	0.216
Teacher experience	0.033	0.006 ***	0.032	0.006 ***	0.030	0.006 ***
Missing on gender	0.008	0.307	-0.003	0.306	0.027	0.292
Missing on race	0.261	0.258	0.270	0.258	0.226	0.254
Missing on teacher experience	0.602	0.262 *	0.585	0.260 *	0.567	0.255 *
Level 3 predictors						
Context and composition						
Proportion of faculty that's female	0.066	0.089	0.055	0.084	-0.025	0.050
Faculty stability	-0.237	0.098 *	-0.178	0.097	-0.142	0.056 *
Integrated student body	0.067	0.333	0.089	0.325	-0.110	0.198
Primarily African-American student body	-0.263	0.258	-0.359	0.257	-0.345	0.174 *
Primarily African-American faculty	-0.027	0.216	0.029	0.208	-0.099	0.153
Primarily White faculty	0.338	0.293	0.359	0.289	0.041	0.171
Pre-reform achievement	0.672	0.578	0.395	0.558	-0.222	0.343
Enrollment stability rate	0.639	0.208 **	0.623	0.210 **	0.381	0.118 **
Neighborhood poverty	-0.045	0.126	-0.033	0.123	-0.031	0.085
Neighborhood stability	0.033	0.122	0.033	0.120	0.003	0.087
Facilitating Factors						
Small school size			0.769	0.296 **	0.072	0.200
Principal supervision					-0.176	0.167
Principal leadership					0.092	0.063
Parent involvement					0.076	0.054
Access to new ideas					0.017	0.086
Teacher socialization					0.157	0.043 ***
Teacher trust					-0.097	0.078
Professional community composite					0.908	0.102 ***
Residual level 2 variance	5.780		5.773		5.612	
Residual level 3 variance	0.731		0.698		0.002	
Proportion of variance explained						
Level 2	0.054		0.055		0.081	
Level 3	0.321		0.351		0.998	

* p <= .05
** p <= .01
** p <= .001

Appendix 1: Analysis Variables

I. Components of Professional Community

Measure/Item (person reliability in parentheses)	Infit Mean Square	Difficulty
Deprivatized practice (.70)		
This school year, how often have you:		
invited someone in to help teach your class(es)	1.21	8.83
had colleagues observe your classroom	0.90	6.97
received meaningful feedback on your performance from colleagues	0.85	6.40
visited other teachers' classrooms	1.10	6.23
received useful suggestions for curriculum materials from colleagues	0.96	4.88
Staff collegiality/collaboration (.75)		
Teachers design instructional programs together	0.79	5.31
Teachers at this school make a conscious effort to coordinate their teaching with instruction at other grade levels	0.83	5.24
The principal, teachers and staff collaborate to make this school run effectively	1.24	4.44
Most teachers at this school are cordial	1.11	3.48
Reflective dialogue (.85)		
This school year, how often have you had conversations with colleagues about the goals of this school	0.84	6.71
This school year, how often have you had conversations with colleagues about development of new curriculum	0.88	6.68
Faculty meetings are often used for problem solving	1.10	5.55
This school year, how often have you had conversations with colleagues about managing classroom behavior	1.00	4.61
This school year, how often have you had conversations with colleagues about what helps students learn best	0.77	4.47
We do a good job of talking through views, opinions and values	1.12	4.45
Many teachers express their personal views at faculty meetings	1.21	4.14
Teachers in this school regularly discuss assumptions about teaching and learning	0.98	3.69
Teachers talk about instruction in the teachers' lounge, faculty meetings, etc.	0.98	2.07
Focus on student learning (.84)		
When making important decisions, the school always focuses on what's best for student learning	.85	4.31
This school has well defined learning expectations for all students	.71	4.23
This school sets high standards for academic performance	.88	4.14
The school day is organized to maximize instructional time	.93	3.92
How many teachers in this school feel responsible that all students learn	1.55	2.80

II. Organizational Correlates of Professional Community

Measure/Item (person reliability in parentheses)	Infit Mean Square	Difficulty
Collective responsibility for school operations and improvement (.90)		
How many teachers in this school feel responsible to help each other do their best	.77	3.21
How many teachers in this school take responsibility for improving the school	1.01	3.18
How many teachers in this school help maintain discipline in the entire school, not just their classroom	.88	3.18
At this school, teachers work together to do what is "best for the kids"	.94	2.53
How many teachers in this school set high standards for themselves	.81	2.21
Teachers support the principal in enforcing school rules	1.35	2.10
Organizational learning (.78)		
How many teachers in the school are willing to take risks to make this school a better place	0.92	3.49
How many teachers in the school are eager to try new ideas	0.79	3.31
Teachers have a "can do" attitude	0.97	3.02
All teachers are encouraged to "stretch and grow"	1.30	2.65
Teachers are continually learning and seeking new ideas	0.87	2.53

III. Predictor Variables

Teacher Characteristics

Female is a dummy variable coded 1 if teacher is female.

Black is a dummy variable coded 1 if teacher is African-American

Hispanic is a dummy variable coded 1 if teacher is Hispanic

Teacher involvement This variable is an indicator of how involved teachers are in the social lives of their schools. It was constructed by taking the log of the sum of the number of hours teachers spent on a number of different committees and subcommittees, special events, and celebrations outside of class during a typical week.

Teacher experience is the total number of years teachers have taught.

School Context

Pre-reform achievement is the log of the mean value of the school's 1988-89 Illinois Goal Assessment Program (IGAP) scores in third, sixth, and eight grade reading and math.

Enrollment stability rate - is the log odds of the proportion of students who took the Iowa Test of Basic Skills (ITBS) in the school in spring 1993 who were also tested in the school in spring 1994.

Neighborhood poverty This variable indicates the level of poverty in the neighborhood in which the school is located. It was constructed by taking the mean of four variables. The first two variables are concentration of poverty indices computed for the school's neighborhood and the neighborhoods of attending students. Each index was formed by averaging the proportion of males 16 years or older who are unemployed and the proportion of residents living below the poverty line. The other two variables included in the neighborhood poverty measure are: the proportion in the school's neighborhood who do not own their home and the proportion from the neighborhoods of students attending the school who do not own their own home. All indices used to construct this variable come from the 1990 U.S. Census.

Neighborhood stability is a composite indicator of residential stability in the neighborhoods in which schools are located. It was constructed by taking the mean of the following: average years tenancy for home owners and renters in the school's neighborhood, and average years tenancy for home owners and renters in the neighborhoods of students attending the school. All indices used to construct this variable come from the 1990 U.S. Census.

School Composition

Small school is a dummy variable coded 1 if the number of students enrolled in the school in 1993 was less than 350.

Proportion of faculty that's female This variable was constructed by taking the log of the quantity (p / 1 - p) where p is the proportion of female faculty members in the school as reported on the questionnaire.

Faculty stability This variable was created by taking the log odds of the proportion of teachers who have been at their current school for 5 or more years.

Integrated student body is a dummy variable that is coded 1 if the percentage of white students in the school is greater than 30 percent.

Primarily African-American student body is a dummy variable that is coded 1 if the percentage of African-American students in the school is greater than 85 percent.

Primarily African-American faculty is a dummy variable that is coded 1 if the percentage of African-American teachers in the school is greater than 65 percent.

Primarily White faculty is a dummy variable that is coded 1 if the percentage of white teachers in the school is greater than 65 percent.

Facilitating Factors

Principal supervision is the mean of two questionnaire items aggregated to the school-

level: To what extent do you agree or disagree that the principal visits classrooms regularly, and to what extent do you agree or disagree that the principal closely supervises teachers' work.

Principal leadership is a 10 item Rasch measure that indicates whether teachers view the principal as a facilitative, inclusive, committed leader. Teachers were asked about the extent to which their principal's leadership facilitated parental and community involvement, instructional improvement, and creating a sense of community in the school.

Parents' involvement with school is a 5 item Rasch measure that focuses on communication with parents and on enlisting their support for the school. Teachers registered how often parents pick up report cards, attend parent-teacher conferences, attend school events, volunteer to help in the classroom, or raise funds for the school.

Access to new ideas is a 6 item Rasch measure that summarizes the extent of teachers' participation in professional development programs offered by their school, the school district, the teachers' union, colleges and universities, and independent networks of teachers.

Teacher socialization is a 5 item Rasch measure that characterizes the extent to which new teachers are inducted into the faculty and made aware of norms among teachers within the school. Teachers answered whether a conscious effort was made by existing faculty to welcome new teachers and to invite them into their classrooms and give them feedback.

Teacher trust is a 6 item Rasch measure that indicates the extent to which teachers relationships within a school are characterized by trust and respect. Teachers reported whether most teachers really care about each other; whether it is O.K. to discuss feelings, worries, and frustrations with colleagues; and whether teachers respect others who take initiative in school improvement efforts.

Appendix 2: Modeling Measures of Professional Community and Outcomes of Professional Community

Two different three-level hierarchical linear models were used for these analyses: one which modeled a composite measure of professional community and another which modeled the correlates of professional community. The model for the composite measure are discussed first.

At level 1, we start with a model where scores on component measures i for teacher j in school k is used to predict a "true score" on a professional community composite.

$$(1) \quad Y_{ijk} = \pi_{ijk} + e_{ijk} \quad ; e_{ijk} \sim N(0, \sigma^2_{ijk})$$

where

Y_{ijk} is a Rasch person measure for one of the four component measures of professional community for teacher j in school k,

π_{ijk} is the "true" value of the professional community composite, and

e_{ijk} is a random effect that represents the deviation of teacher jk's outcome measure from that predicted by the Level-1 model.

In most linear modeling applications, we assume that measurement error, e_{ijk}, is unknown and normally distributed with mean 0 and some constant variance. However, the standard errors estimated for each Rasch outcome measure, s_{ijk}, permit us to explicitly address measurement error in our model. Specifically, we adjusted the component measures for their unreliability by multiplying both sides of the equation (1) by the inverse of the standard error estimates for each component

$a_{ijk} = s_{ijk}^{-1}$, so that

$$(2) \quad Y^*_{ijk} = a_{ijk}\,\pi_{ijk} + e_{ijk} \quad ; e^*_{ijk} \sim N(0, 1)$$

Note that when we adjust for measurement error, σ^2 is fixed at 1.

At level 2, teachers' "true scores" are modeled as a function of a set of teacher-level characteristics, X_{pjk}. Individual teacher variation in the "true scores" is captured in r_{jk} which is assumed to be normally distributed with mean 0 and variance τ_π.

$$(3) \quad \pi_{jk} = \beta_{0k} + \sum_{p=1}^{P} \beta_{pk}\,(X_{pjk} - \overline{X}_{p\cdot}) + r_{jk} \quad ; r_{jk} \sim N(0, \tau_\pi)$$

By centering the teacher-level predictors about their grand means, β_{0k} becomes the predicted mean for school k if it had an "average" faculty composition as measured by the

predictor variables. The relationship between these p=1…,P predictors and the outcome are captured in β_{pk}.

At level 3, the adjusted school means, B_{0k}, are modeled as a function of school characteristics

$$(4) \qquad \beta_{0k} = \gamma_{00} + \sum_{q=1}^{Q} \gamma_{0q} W_{qk} + u_{0k} \quad ; u_{0k} \sim N(0, \tau_\beta)$$

where γ_{00} is the estimated grand mean of the professional community composite adjusted for measurement error and faculty composition, γ_{0q} are q=1…,Q coefficients expressing the relationship between school characteristics and professional community, and u_{0k} is individual variation attributable to school k.

The level 1 equation used to predict the correlates of professional community was slightly different than that used for the composite measure. Each correlate of professional community was modeled separately, so that π_{jk} represents a teacher's "true score" on a single measure rather than on a composite. Thus, by dropping the subscript for the component measures from (2), the level 1 model becomes:

$$(5) \quad Y^{*}_{jk} = a_{jk} \pi_{jk} + e_{jk} \quad ; e^{*}_{jk} \sim N(0, 1)$$

The equations for level 2 and level 3 remain the same.

Endnotes

1. See for example Goals 2000 (U.S. Department of Education, 1993). Requirements of high standards for all are written into the recent reauthorization of Title I. They are also reflected in documents of various standard-setting groups (see for example NCTM, 1989)

2. Rowan (1992) articulates the linkage among instructional aims, teaching pedagogy, and the mechanisms for workplace place control needed to support this. This basic theory was drawn upon by Newmann and Wehlage (1995) in their concentric circles of support for restructuring schools to promote more rigorous student intellectual work. We draw on these same ideas here.

3. Both Bryk and Seashore Louis were principal investigators as part of the federally funded national Center on the Organization and Restructuring of Schools (CORS) at the University of Wisconsin-Madison. The work reported here is a part of this integrated research program.

4. The Consortium on Chicago School Research is committed to pluralistic inquiry. All data collected by the Consortium are made available to other investigators in easy to access public use data sets. A CD diskette containing all of the surveys completed to date, some system level information and corresponding code books and SAS code are available from the Consortium. A modest fee is charged to cover reproduction costs.

5. Other analyses revealed similar amounts of between-school variation in the component measures of professional community. Specifically, the proportion of variance between schools was .17 for focus on student learning, .12 for reflective dialogue, and .15 for deprivatized practice. Interestingly, more than one-fourth (.27) of the variation in the collegiality/collaboration measure fell between schools.

6. Some teachers in our sample lacked data on gender, race and teacher experience. Because the program that estimates three-level HLMS, does not tolerate missing data at levels 2 and 3, a series of dummy variables that indicated teachers were missing on these predictors were created. Specifically, when teachers were missing on one of the three predictors, the variable itself was coded 0 and the corresponding missing data dummy variable was coded 1. In essence, we have added another category, "don't know", to each variable.

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